

Augmented Reality the UITS Advanced Visualization Lab

(for the digital arts & humanities at Indiana University)

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Digital Arts and Humanities Workshop Series – Fall 2017

Fridays @ noon -- Scholars Commons IQ-Wall

Date	Topic	Presenter
Aug. 25	Intro to Visualization	Michael Boyles
Sep. 1	Intro to Digital Humanities	Tassie Gniady
Sep. 8	Virtual Reality	Bill Sherman
Sep. 15	Intro to R	Tassie Gniady
Sep. 22	Advanced Media	Chris Eller
Sep. 29	Augmented Reality	Chauncey Frend
Oct. 13	R for Text	Tassie Gniady
Oct. 20	Network Graphs	David Kloster
Oct. 27	IQ-Tables & Touch-Enabled Software Workflows	David Reagan
Nov. 3	3D Scanning & Printing	Jeff Rogers
Nov. 10	3D Photogrammetry	Tassie Gniady
Dec. 1	R for Twitter	Tassie Gniady



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Goals for Today

Goals

- Getting acquainted with AR
 - What is it?
 - Brief History
 - IU & Elsewhere Examples
- Making your own Augmented Reality
 - Fundamental Forms
 - Workflow (Assets + Interface + Display)
- Resources, ready now!



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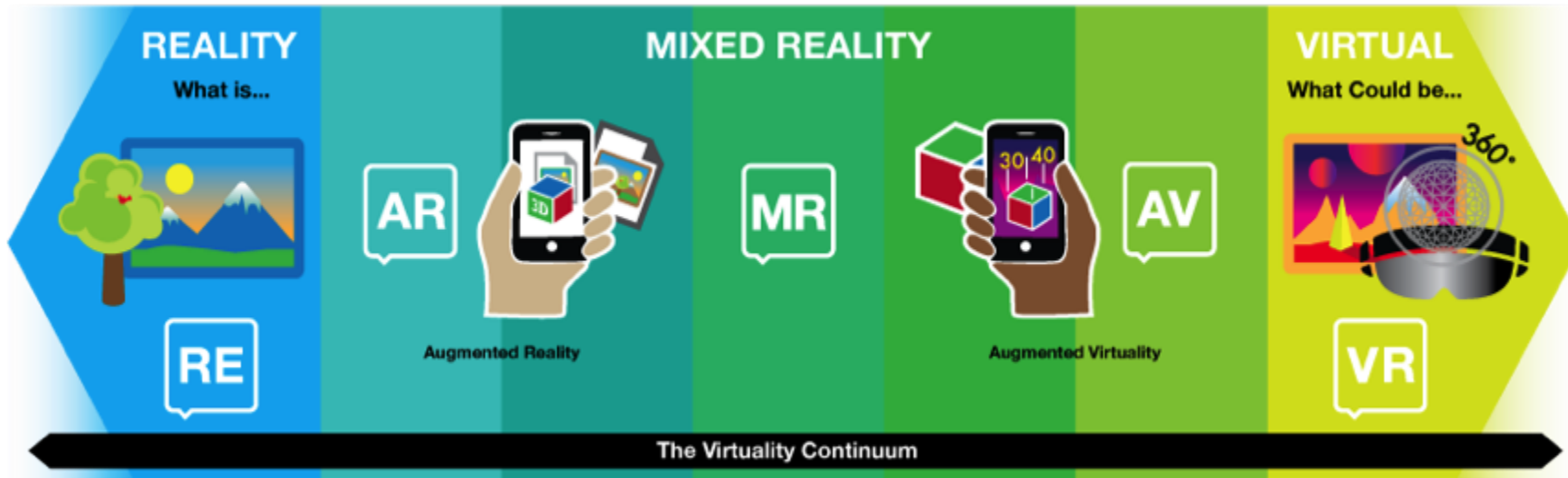


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What is Augmented Reality?



Milgram, Paul, et al. "Augmented reality: A class of displays on the reality-virtuality continuum." *Photonics for industrial applications*. International Society for Optics and Photonics, 1995.

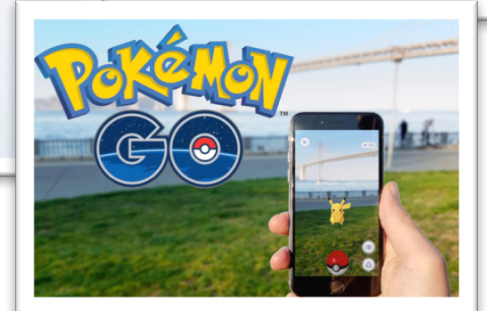
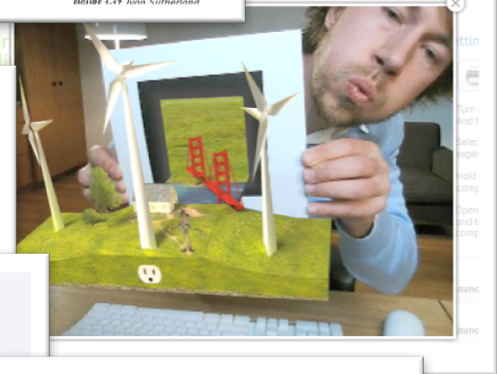
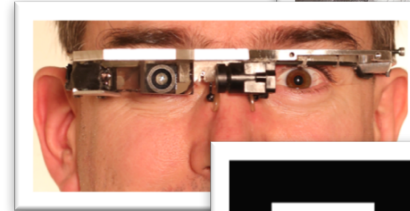
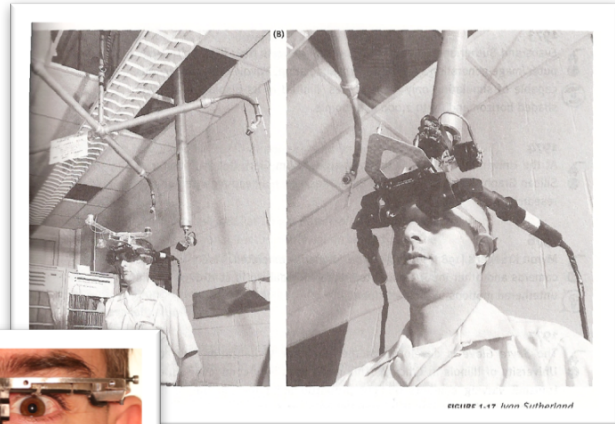
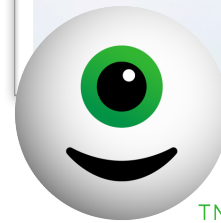
Photo Source: <http://smartideasblog.trekk.com/augmented-or-virtual-how-do-you-like-your-reality>



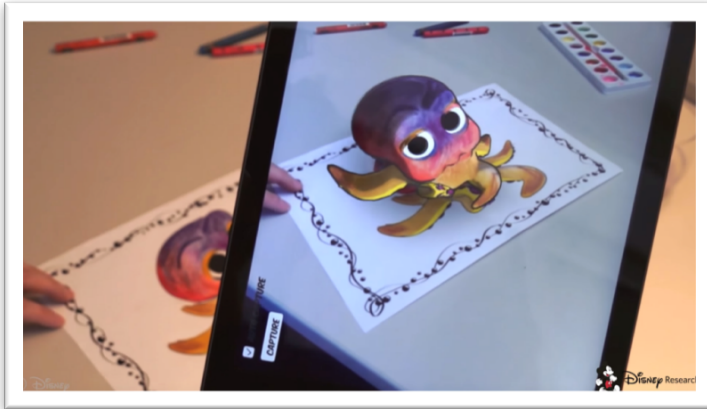
Brief History

- 1901 Lyman Frank Baum author of “The Master Key” imagines a kind of AR.
- 1968 Ivan Sutherland invents first head-mounted display “Sword-of-Damocles” at University of Utah.
- 1999 ARToolkit was created by Hirokazu Kato at HITLab
- 2010 Vuforia for AR Mobile Apps was released by Qualcomm.
- 2013 Google announces Google Glass.
- 2015 Microsoft announces the HoloLens.
- 2016 Niantic released Pokémon Go.

vuforia
by Qualcomm



AR today – Industry Examples



AR Coloring Book
(0:00-0:30)



HoloLens Architecture
(1:32-2:04)



Augmented Climbing Wall
(0:00-0:33)



AR today – Industry Examples

Commercial AR/MR systems are advancing rapidly toward becoming a commodity “off the shelf” technology



AR kit by Apple



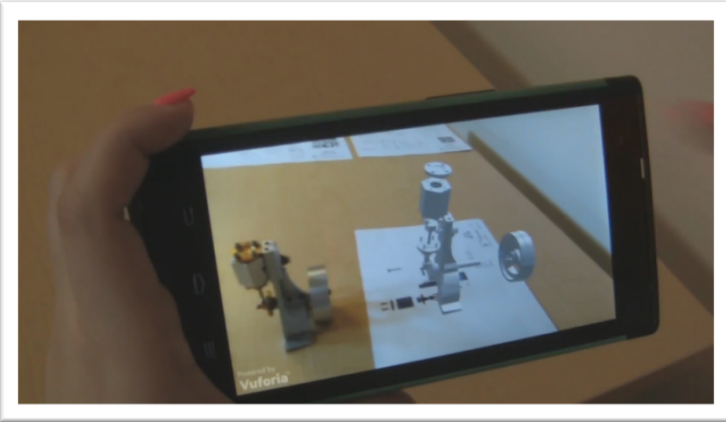
AR Studio by Facebook



HoloLens by Microsoft



AR today – at IU



Mechanical 2D to 3D Class Tool



**HoloLens Development Edition
(Live Preview)**



Biomedical Training



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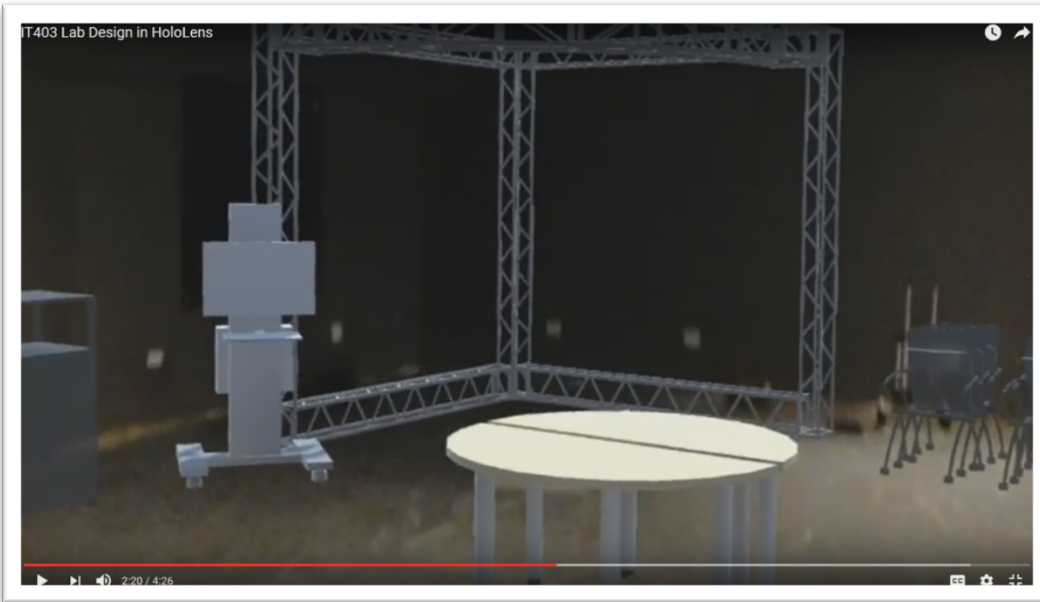
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AR today – at IU

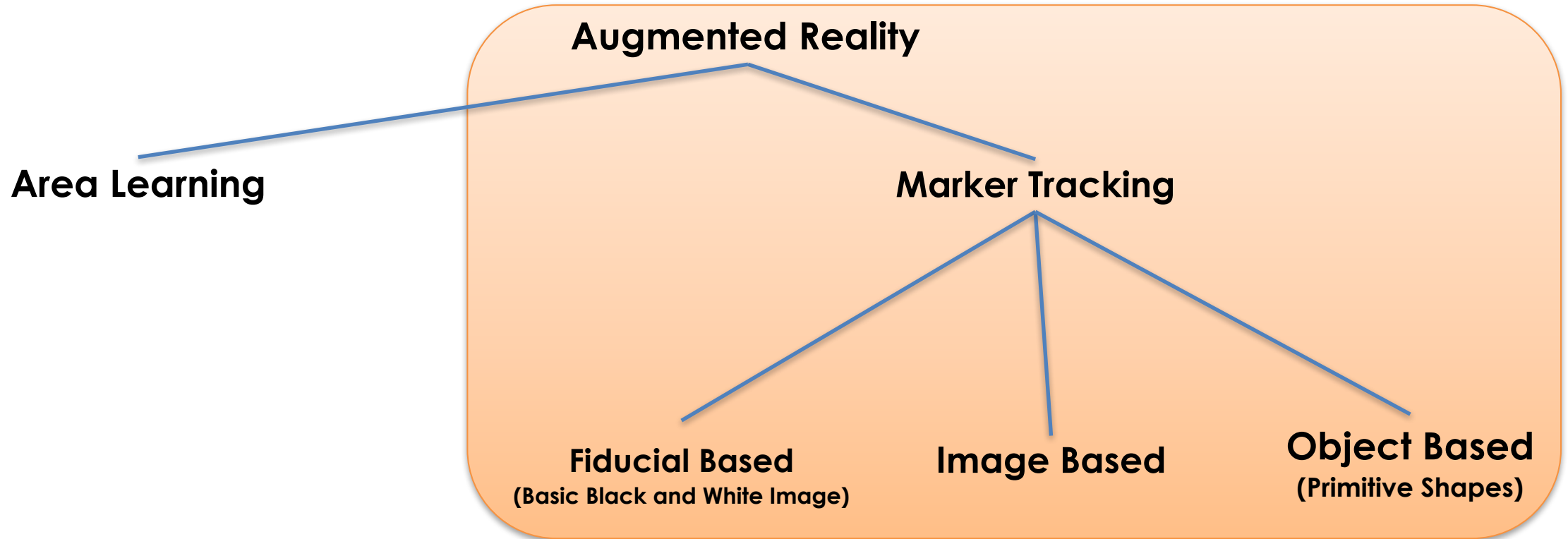
Use Case: Using the HoloLens for Space Planning



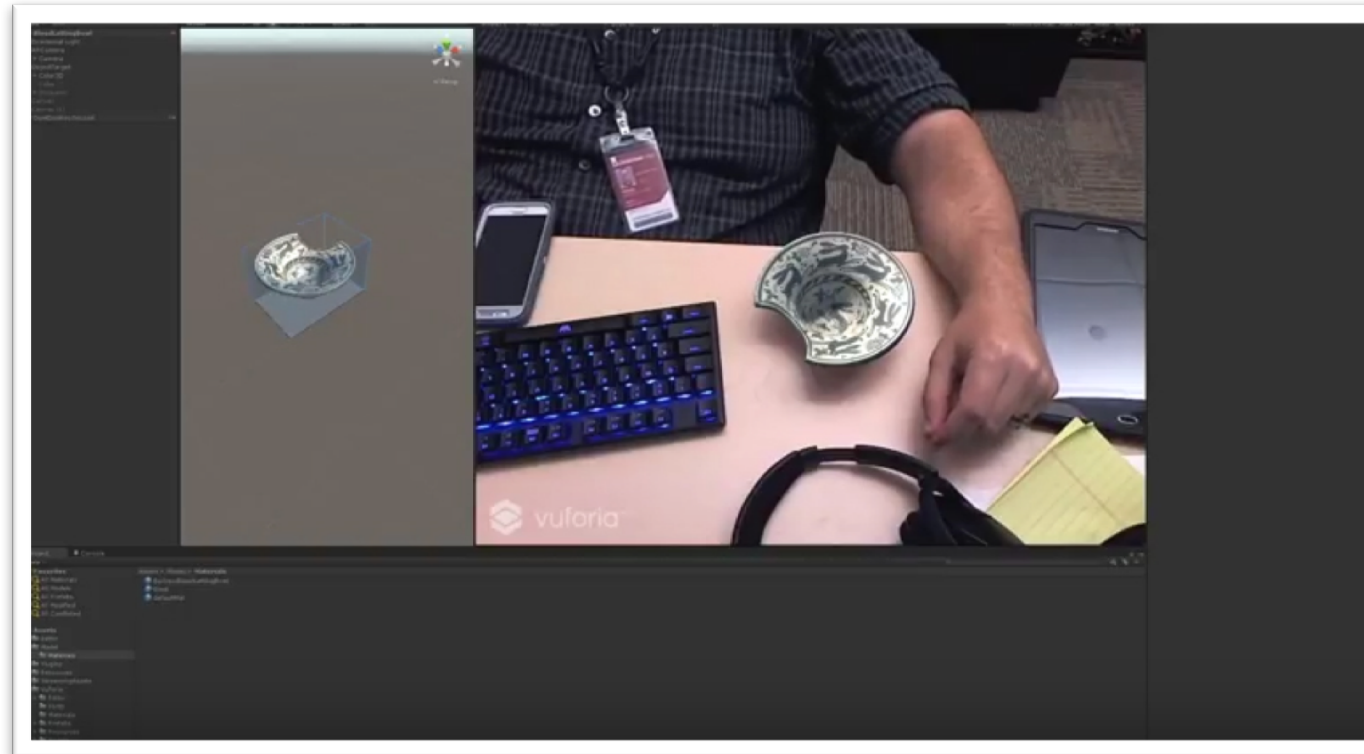
- Existing IUPUI lab to be refitted with new tech/furniture
 - Create 3D models of potential tech/furniture
 - Place those 3D models in the real space and view using HoloLens
- Enables better decision-making
 - Better sense of scale



Fundamental Forms



Object Tracking Example



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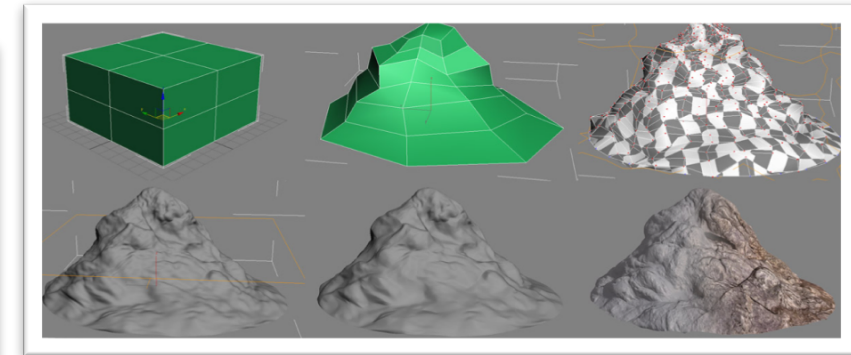
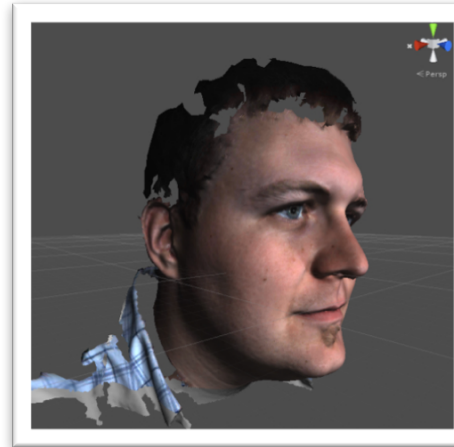


Building Experiences

Assets + Display + Interface

Sourcing or Building Data

- 3D Digitization
 - 3D Scanning
 - Photogrammetry
- 3D Authoring
 - Autodesk Maya or Max
 - Sketchup
 - TinkerCAD
- 3D Repositories
 - Sketchup 3D Warehouse
 - Smithsonian X 3D <https://3d.si.edu/browser>
 - Sketchfab*
 - Thingiverse*
- You can also augment with media
 - Audio
 - 2D media (Image & video)
 - Text



Building Experiences

Assets + **Display** + Interface

Mobile Devices



PC or Mac with Webcam



HoloLens Headset

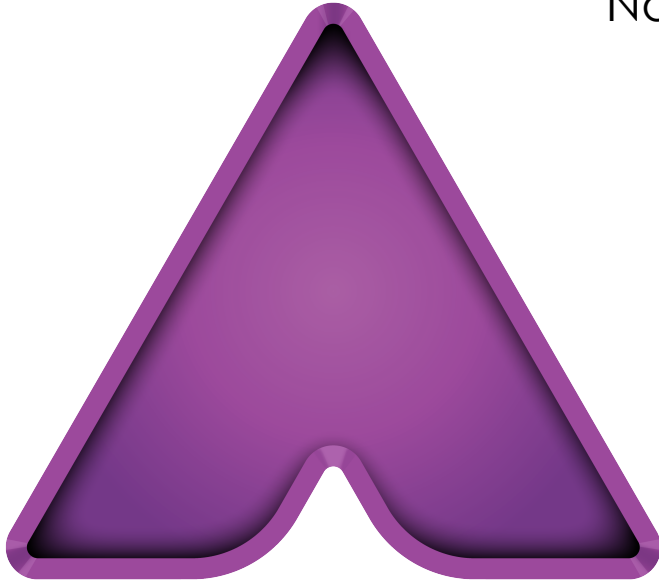


Building Experiences

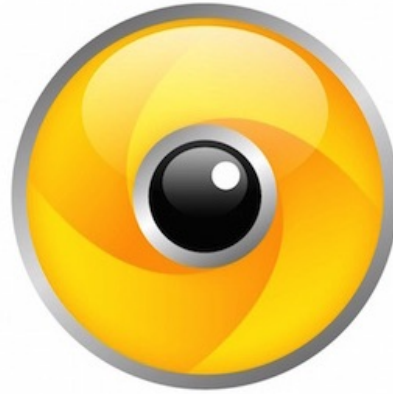
Assets + Display + **Interface**

Onboarding AR – Prototyping Tools

No programming required



AURASMA



wikitude

See more.



Building Experiences

Assets + Display + **Interface**

Development Tools

Base Package



AR Plugins



AR Technology

- Mobile Device Apps
- Image or Object Markers
- Desktop or Laptop Apps
- Fiducial or Image Markers
- HoloLens device Apps
- Area Learning or Image Markers



What the future may hold

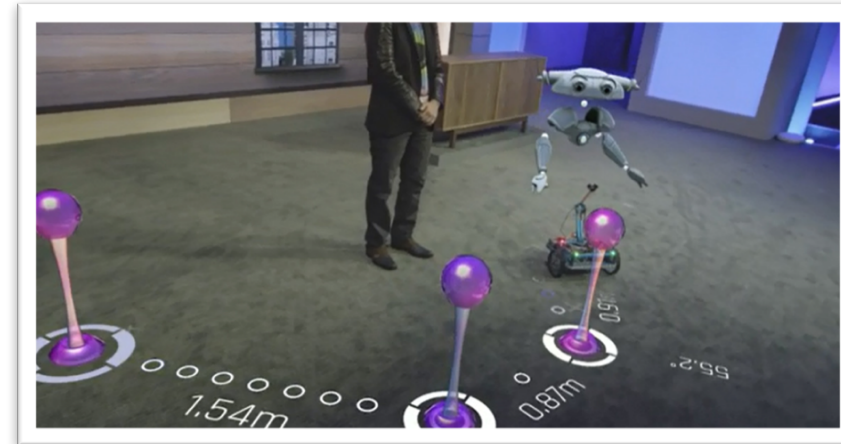
Web Hosted AR Applications



Consumer-grade headsets



Cyber Physical AR Applications



(2:16-3:04)

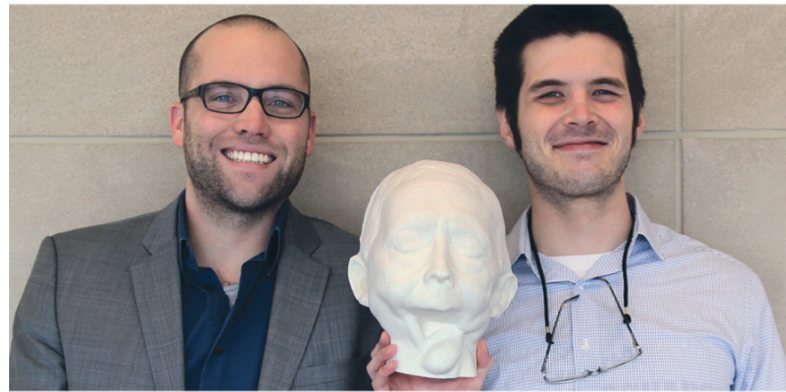


What the future may hold

Research Example at IU



Travis Bellicchi with Shirley
Anderson wearing his prosthesis
| PHOTO BY ABIGAIL WATSON



School of Informatics and Computing faculty
member Zeb Wood, left, and Cade Jacobs, a
student, were instrumental in making 3-D models
used to fabricate the prosthesis.



Mark Sporleder wearing his VFACS headset
with an augmented nose prosthesis.



Base Package



Resources for you!

My general explanation of Unity

<https://www.youtube.com/watch?v=mM9Kwv3TEBI>

Tutorials <https://unity3d.com/learn>

AR Plugins



ARTOOLKIT



Vuforia Basics Tutorial By: Chauncey

<https://www.youtube.com/watch?v=qbl9PrSUo5w>

Using Vuforia For HoloLens Static Room Calibration In Unity (Tutorial)

<https://www.youtube.com/watch?v=W7z2sggDGoo>

Website: avl.iu.edu

Email: vishelp@iu.edu



Demos and Discussions

- Microsoft HoloLens
- Biomedical Training AR App
- Paleontology AR App
- Video Card AR App

[AR YouTube Playlist](#)



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